

# DIN EN 16729-5:2023-07 (E)

## Railway applications - Infrastructure - Non-destructive testing on rails in track - Part 5: Non-destructive testing on welds in track

---

<b>Contents</b>		<b>Page</b>
European foreword .....		4
Introduction .....		5
1	Scope .....	6
2	Normative references .....	6
3	Terms and definitions .....	6
4	Symbols and abbreviations .....	6
5	NDT methods to detect defects in rail welds .....	7
5.1	General .....	7
5.2	Visual testing - VT .....	9
5.2.1	General .....	9
5.2.2	VT inspection zone .....	9
5.2.3	Example of defects .....	9
5.3	Ultrasonic Testing -- UT .....	9
5.3.1	General .....	9
5.3.2	UT inspection zone .....	9
5.3.3	Example of defects .....	9
6	Description of weld defects .....	10
6.1	Defects in electric arc repair welds .....	10
6.1.1	Volumetric defects - Porosity .....	10
6.1.2	Planar defects .....	11
6.2	Defects in flash butt welds (Tri-metallic welds) .....	15
6.3	Defects in aluminothermic weld .....	17
6.3.1	Volumetric defects .....	17
6.3.2	Planar defects .....	23
6.3.3	Thermal contraction (Hot Tear) .....	27
6.3.4	Fatigue cracks .....	28
7	Documentation .....	30
7.1	General .....	30
7.2	Requirements of documentation VT .....	30
7.3	Requirements of documentation UT .....	30
Annex A (informative) Visual testing procedures on welds .....		31
A.1	General .....	31
A.2	Visual testing on welds .....	31
A.2.1	Testing equipment .....	31
A.2.2	Testing preparation and procedure .....	31
Annex B (informative) Ultrasonic testing procedures on welds .....		32
B.1	General .....	32
B.2	Ultrasonic testing on welds .....	32
B.2.1	Testing equipment .....	32

B.2.2	Testing preparation and procedures .....	39
B.3	Phase W: Walking stick .....	39
B.3.1	General .....	39
B.3.2	Overview .....	39
B.3.3	Reference block for inspection W.1 .....	39
B.3.4	Reference block for inspections W.2 and W.3 .....	39
B.3.5	Transfer correction applied to inspections W.1 to W.3 .....	40
B.3.6	Couplant .....	40
B.3.7	Inspection zone .....	40
B.4	Phase H: Single probes .....	40
B.4.1	General .....	40
B.4.2	Overview .....	40
B.4.3	Reference block for inspection H.1 .....	40
B.4.4	Reference block for inspection H.2 .....	41
B.4.5	Reference block for inspections H.3 and H.4 .....	41
B.4.6	Transfer correction applied to inspections H.1 to H.4 .....	41
B.4.7	Couplant .....	44
B.4.8	Inspection zones .....	44
B.5	Phase T: Tandem 45° on the running surface .....	48
B.5.1	Overview .....	48
B.5.2	Reference block for inspection T.1 .....	48
B.5.3	Transfer correction applied to inspection T.1 .....	48
B.5.4	Couplant .....	48
B.5.5	Inspection zone for T.1 .....	48
B.6	Phase TS: Tandem 70° on the side of the rail head, web and foot .....	49
B.6.1	Overview .....	49
B.6.2	Reference block for inspection TS.1 .....	50
B.6.3	Reference block for inspection TS.2 .....	51
B.6.4	Reference block for inspection TS.3 .....	52
B.6.5	Transfer correction applied to inspections TS.1 to TS.3 .....	52
B.6.6	Couplant .....	53
B.6.7	Inspection zones .....	53
Bibliography .....		55